

## **REMARKS**

### **I. Status of Claims**

Claims 1-5 and 7-17 are pending in this application. Claims 1 and 16 are independent. Claims 18 and 19 are canceled herewith without prejudice to and/or disclaimer of the subject matter therein.

Claims 1-3, 10, and 16 are currently amended. Support for the additional claim language of claims 1 and 16 can at least be found in the Applicant's specification on, for example, page 15, line 6 to page 16, line 7; page 17, lines 9-12; page 18, line 34 to page 19, line 10; and claims 18-19.

Claims 1-5, 10-16, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaller et al. (U.S. Patent 6,948,311) ("Schaller") in view of Tashiro et al. (U.S. Patent 6,622,480) ("Tashiro").

Claims 7-9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaller in view of Tashiro as applied to claim 1 above, and further in view of Christen et al. (U.S. Patent 6,405,528) ("Christen").

The Applicant respectfully requests reconsideration of the rejections in view of the foregoing amendments and the following remarks.

### **II. Pending Claims**

Claims 1 and 16, the only independent claims, stand rejected under 35 USC 103(a) as allegedly being unpatentable over Schaller in view of Tashiro.

The Applicant respectfully submits that claim 1 is patentable over the cited references at least because it recites, *inter alia*, "...a first comparing section, wherein, when the fuel adding device is continuously adding fuel to exhaust gas, the first determining section compares an estimated accumulation amount of particular matter in the exhaust purifying mechanism with a threshold value...", "...a setting section, wherein, when the first determining section determines that the estimated accumulation amount of particular matter becomes equal to or less than the threshold value and the second comparing section determines that the pressure difference exceeds the pressure difference reference value, the setting section **switches** the manner of

adding fuel of the fuel adding device from the continuous fuel addition to intermittent fuel addition such that the temperature distribution of the exhaust purifying mechanism is suppressed from being uneven...,” and “...**the threshold value is a value for determining that the intermittent fuel addition does not cause abrupt burning of particulate matter, and the pressure difference reference value is a value for determining that the continuous fuel addition does not cause sufficient burning of particulate matter.**”

The Applicant respectfully submits that claim 16 is patentable over the cited references at least because it recites, *inter alia*, “...comparing an estimated accumulation amount of particular matter in the exhaust purifying mechanism with a threshold value when continuous fuel addition is being executed...,” “...**switching** the manner of adding fuel from the continuous fuel addition to intermittent fuel addition such that the temperature distribution of the exhaust purifying mechanism is suppressed from being uneven when it is determined that the estimated accumulation amount of particular matter becomes equal to or less than the threshold value and the pressure difference exceeds the pressure difference reference value...,” and “...**the threshold value is a value for determining that the intermittent fuel addition does not cause abrupt burning of particulate matter, and the pressure difference reference value is a value for determining that the continuous fuel addition does not cause sufficient burning of particulate matter.**” (emphasis added)

The Applicant respectfully submits that, following the above-identified amendments, without waiving any argument and to facilitate prosecution, the inventions of claims 1 and 16 have been amended to clarify that when fuel is being continuously added to exhaust gas, an estimated accumulation amount of particular matter in the exhaust purifying mechanism is compared with a threshold value<sup>1</sup>. Also, when fuel is being continuously added to exhaust gas, a pressure difference between a section upstream, and a section downstream, of the exhaust purifying mechanism is compared with a pressure difference reference value<sup>2</sup>.

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<sup>1</sup> It is respectfully submitted that the threshold value is a value for determining that the intermittent fuel addition does not cause abrupt burning of particulate matter.

<sup>2</sup> The Applicant respectfully submits that the pressure difference reference value is a value for determining that the continuous fuel addition does not cause sufficient burning of particulate matter.

Accordingly, when it is determined that the estimated accumulation amount of particular matter becomes equal to or less than the threshold value and the pressure difference exceeds the pressure difference reference value, the manner of adding fuel is **switched** from continuous fuel addition to intermittent fuel addition.

In the inventions of claims 1 and 16, if the estimated accumulation amount of particular matter becomes equal to or less than the threshold value when fuel is being continuously added to exhaust gas, it is determined that the intermittent fuel addition does not cause abrupt burning of particulate matter. Also, if the pressure difference exceeds the pressure difference reference value when fuel is being continuously added to exhaust gas, it is determined that the continuous fuel addition does not cause sufficient burning of particulate matter. Further, when it is determined that the intermittent fuel addition does not cause abrupt burning of particulate matter and the continuous fuel addition does not cause sufficient burning of particulate matter, the manner of adding fuel is **switched** from the continuous fuel addition to the intermittent fuel addition.

In other words, even if the pressure difference exceeds the pressure difference reference value (i.e., even if the continuous fuel addition does not cause sufficient burning of particulate matter), the manner of adding fuel is not switched from the continuous fuel addition to the intermittent fuel addition as long as the estimated accumulation amount of particular matter is greater than the threshold value (i.e., as long as there is a possibility that the intermittent fuel addition will cause abrupt burning of particulate matter).

The Applicant respectfully submits that this prevents the temperature of the exhaust purifying mechanism from being excessively increased due to abrupt burning of a large amount of particulate matter caused by the intermittent fuel addition.

With respect to Schaller, this reference teaches that the manner of adding fuel is controlled in accordance with the pressure difference between a section upstream and a section downstream of the exhaust purifying mechanism; however, it does not switch from continuous fuel addition to intermittent fuel addition based on the estimated accumulation amount of particular matter and the pressure difference as recited in the inventions of claims 1 and 16.

Regarding Tashiro (e.g., *See* Figure 8), this reference teaches that, when the PM accumulated estimation value  $PM_s$  exceeds a judgment value  $PM_{max}$  or when the exhaust

pressure  $P_e$  exceeds a first judgment value  $P_{max}$  (Yes in step S21), a post injection of fuel is performed until the DPF temperature  $T_e$  attains a second target temperature  $T_{e2}$ , which allows the PM to burn (step 533). *See* column 15, lines 34-38, column 16, lines 17-22. Figure 11 shows a detailed process of step 533 of Figure 8.

In step 533b of Figure 11, the post injection timing is controlled until the exhaust pressure  $P_e$  or differential pressure  $\Delta P_e$  becomes equal or inferior to a second exhaust pressure value  $P_{e2}$  (or second differential pressure  $\Delta P_{e2}$ ). *See* column 16, lines 26-33. *See also*, column 16, lines 55-59 which describes that "the start of the PM combustion can be confirmed by the fact that the exhaust pressure  $P_e$  or differential pressure  $\Delta P_e$  becomes equal or inferior to the second exhaust pressure value  $P_{e2}$  (or second differential pressure  $\Delta P_{e2}$ ).

That is, Tashiro merely teaches that, when the PM accumulated estimation value  $PM_s$  or the exhaust pressure  $P_e$  exceeds a threshold value, a post injection of fuel is performed, and that, when the differential pressure  $\Delta P_e$  reaches the second differential pressure  $\Delta P_{e2}$ , it is determined that the DPF temperature  $T_e$  reaches the target temperature  $T_{e2}$ , which allows the PM to burn.

Therefore, to summarize, the Applicant respectfully submits that the cited references, either alone or in combination, do not suggest or teach the claimed subject matter as follows:

- a) based on the estimated accumulation amount of particular matter, it is determined that the intermittent fuel addition does not cause abrupt burning of particulate matter;
- b) based on the pressure difference, it is determined that the continuous fuel addition does not cause sufficient burning of particulate matter; and
- c) **based on these determination results**, the manner of adding fuel is **switched** from the continuous fuel addition to the intermittent fuel addition.

Further, the Applicant respectfully submits that lacking any teaching and/or identifying reason why one of ordinary skill in the art would modify Schaller/Tashiro in the manner as claimed by the Applicant, the references do not anticipate and/or render obvious the Applicant's

invention. The Applicant respectfully submits that, as discussed in *KSR Int'l Co. v. Teleflex, et al.*, No. 04-1350, (U.S. Apr. 30, 2007), it remains necessary to identify the reason why a person of ordinary skill in the art would have been prompted to combine alleged prior art elements in the manner as claimed by the Applicant. Obviousness cannot be sustained on mere conclusory statements.

Therefore, the Applicant respectfully submits that, for at least these reasons, claims 1 and 16, as well as their dependent claims, are patentable over the cited references.

### **III. Conclusion**

In light of the above discussion, the Applicant respectfully submits that the present application is in all aspects in allowable condition, and earnestly solicits favorable reconsideration and early issuance of a Notice of Allowance.

The Examiner is invited to contact the undersigned at (202) 220-4420 to discuss any matter concerning this application. The Office is authorized to charge any fees related to this communication to Deposit Account No. 11-0600.

Respectfully submitted,

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